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Doctorate Of Philosophy

EFFECT OF TRANSDCIPLINARY TRAINING PROTOCAL ON PERIMENOPUASAL AND POSTMENOPAUSAL PROBLEMS OF SEDENTARY WOMEN

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ABSTRACT

This Research problem is all about menopause a stage of transition in every women life. In this stage here women goes through various problems of cardiovascular diseases, sleeping insomnia, vasomotor symptoms, depression, weight gain and many more. These problems has been observed in many women. These type of researches provide awareness among women about menopause and its severity. If not dealt properly can lead health risk. Through this study we can think about of well-being of women. There are many studies done on menopause, the data written over here is based on several studies and reviews.

Key words : menopause, cardiovascular diseases, insomnia weight gain, reviews.
Language: English

EFFECT OF TRANSDISCIPLINARY TRAINING PROTOCOL ON PERIMENOPAUSAL AND POSTMENOPAUSAL PROBLEMS OF SEDENTARY WOMEN

A

SYNOPSIS

DOCTOR OF PHILOSOPHY

To

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By

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CERTIFICATE

I hereby declare that synopsis "**EFFECT OF TRANSDISCIPLINARY TRAINING PROTOCOL ON PERIMENOPAUSAL AND POSTMENOPAUSAL PROBLEMS OF SEDENTARY WOMEN"** being submitted in partial fulfilment of the requirement for the degree of doctor of philosophy in exercise physiology under department of exercise physiology of Lakshmibai National Institute Of Physical Education, Gwalior,MP,India, during the academic session 2021-2022. It is a bona fide record of riginal work carried out under the supervision of Dr. Birendra Jhajharia and has not been submitted in full or part any other university or institute for a degree. Further , it is certified that the synopsis is plagiarism free.

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CHAPTER – I

INTRODUCTION

Menopause is an adaptation process during which women's go through a new biological state. This process is accompanied by many biological and psychological changes. Menopause is a physiological phase that is characterized by the permanent cessation of menstrual periods in women due to loss of ovarian follicular function. *(Aysegul Agil, article, 2010)*

During menopause women experience various physical, psychological, and social changes that may affect their quality of life. *(Aysegul Agil, article, 2010)*

It has been estimated that mostly women exhibit symptoms such as, hot flashes, night sweats, vaginal dryness, depression, cardiovascular diseases, menopausal arthritis, osteoporosis, sleep disturbance, hypertension, headaches. *(Aysegul Agil, article, 2010)*

Menopause is permanent cessation of menses and is defined as occurring 12 months after the final menstrual periods. It is typically reached between the age of 40 and 57 years. *(Aysegul Agil, article, 2010)*

The menopause transition in women is driven by the declining of female sex hormones (estrogens and progesterone). Women are born with all their eggs, which are stored in their ovaries. Their ovaries make the hormones estrogen and progesterone, which control their period (menstruation) and the release of eggs(ovulation). Menopause happens leads to no longer release the eggs from the ovaries every month. Menopause leads to hormonal imbalance. *(Physiology Of Sports and Exercise by Jack H. Wilmore book)*

Menopause is a regular part of aging when it happens after age of 40, but some women can go through menopause early. If it happens before age of 40, for any reason, it is called premature menopause.

Menopause has its effect on the quality of life of women. Most of the women have been suffering from the menopausal symptoms but are unaware of the facts or impacts of these menopausal symptoms. To help women manage this event it is important to identify their health information need.
The information regarding the information can be collected through face-to-face interactions or Q&A. These information's help increase awareness and reduce anxiety of women experiencing menopause.

Various hormone therapies help reduce the menopausal symptoms, but they tend to increase risk factors associated to breast cancer, stroke, hypertensive disorder, and blood clots. Therefore, on the other hand exercise has been investigated as a potential alternative treatment for alleviating the menopausal symptoms. These non-communicable diseases are more common among women with menopause and it leads to death.

The perimenopausal and postmenopausal study here is a cross-sectional study.

Menopause has three stages:

1. PERIMENOPAUSE: Is the time leading up to menopause. It describes a time when hormones start to decline and menstrual cycle becomes erratic and irregular. Here the body makes natural transition to menopause, making the end of reproductive years. Perimenopause is also called as menopausal transition. Whereas women start perimenopause at different stages. It leads to some signs/symptoms such as: • Irregular or skipping periods.

- Periods that are heavier or lighter than usual.
- Hot flashes
- Vaginal dryness
- Urinary urgency.

1. **MENOPAUSE:**

Menopause is a natural process. It is the time that marks the end of your menstrual cycle. It is diagnosed after you have gone 12 months without a menstrual period. This usually occurs in the age group of 40 to 50. Menopause leads to hormonal imbalance. It has its effect on the female sex hormones, (estrogen and progesterone). Their production begins to decline. Making you less likely to be pregnant. Menopause leads to certain signs/symptoms:

- Irregular periods
- Mood changes
- Breast soreness
- Weight gain • Slowed metabolism
- Chills.
- Hypertension
- Thinning hair and dry skin.
- Insomnia

2. **POSTMENOPAUSE:**

It is the time after you have been without periods almost more than 12 months, this stage is the extension of menopause as the menopausal symptoms go away or get milder. This occurs generally in women who have reached age between 45 to 57 years. People in post menopause are at increased risk for osteoporosis and heart diseases. Post menopause leads to certain signs/symptoms:

- Cardiovascular diseases
- Osteoporosis
- Menopausal arthritis
- Mental confusion
- Difficulty concentrating

Menopause can be dealt with exercises or training methods. As menopause has risks factors of cardiovascular diseases, osteoporosis, psychological problems which can be treated with physical activities. Those exercises or training are

1. **Aerobic exercises:**
   Aerobic exercise is any type of cardiovascular conditioning. It includes activities like brisk walking, swimming, running, jogging or cycling. Aerobic exercises mean with

oxygen where you're breathing and heart rate will increase during aerobic activities. Aerobic exercises reduce the risk of many conditions which causes menopause. These conditions include obesity, heart diseases, high blood pressure, cholesterol level, type 2 diabetes, stroke and certain type of cancers. Weight bearing aerobic exercises, such as walking, help lower the risk of osteoporosis. Exercising during menopause help you lose excess weight, protection from various types of cancer, strengthening your bones, and also maintain the risk of heart diseases. *(Science of sports training by Hardayal Singh) (1991)*

2. **Anaerobic exercises:**

Anaerobic exercises are a type of exercise that breaks down glucose in the body without using oxygen, in practical terms anaerobic exercises are more intense but are shorter in duration. These anaerobic exercises help increase the estradiol level by 14% to 16% during menopause. It is found to be more potent on lean mass as well. *(Science of sports training by Hardayal Singh) (1991)*

3. **Strength training:**

Strength training or resistance training involves the performance of physical exercises that are designed to improve strength and endurance. These strength training exercises help make bones stronger, develop muscle mass. Strength training can also be done by using own body weights, calisthenics, by using resistance bands, isometrics. *(Science of sports training by Hardayal Singh) (1991)*

4. **Stretching and balancing exercises:**

Stretching exercises means an act of releasing tension from muscles, joints, ligaments and tendons. Balancing exercise means exercises that help you keep you upright, including your legs and core. *(Science of sports training by Hardayal Singh) (1991)*

Sedentary Women:

Sedentary women are the group of females who lead sedentary life, where most of their time is spent doing only basic activities, including sitting, standing, reading, regular household course. (Acc to WHO) (year 2016)

As these women don't participate in any type of physical activities which lead them towards many physical and mental health issues. Among the health problems faced by these women one of the physical and mental problem is menopause which is most prevalent in sedentary women which leads to several health issues in different stages of menopause, (perimenopause, menopause, post menopause).

After going through many reviews and finding the gap of knowledge about the effect of interventional plan on perimenopause and postmenopuase. The researcher decided to do this study.

STATEMENT OF PROBLEM

The statement of the problem is to investigate the effect of Transdisciplinary Training Protocol on the perimenopausal and postmenopausal problems of sedentary women.

OBJECTIVES OF THE STUDY

1. To investigate the effect of transdisciplinary training protocol on problems of perimenopausal sedentary women.
2. To investigate the effect of transdisciplinary training protocol on problems of postmenopausal sedentary women
3. To identify which stage of menopause is gaining more benefit of selected training programs.
4. To identify which of the two selected stages of menopause is more sever.

DELIMITATIONS

1. The study will be delimited to 40 menopausal sedentary women.
2. The study will be delimited to two groups of perimenopausal and postmenopausal group.
3. The study will be delimited to Varanasi (U.P.) region sedentary women.
4. The sedentary women would range between the age of 40 to 57 years.
5. The training approach will be of 6 weeks.
6. The study will be confined to a 30 to 45 minutes training session.
7. The study will be further delimited to Perimenopausal and Postmenopausal problems of sedentary women.

HYPOTHESIS

On the basis of the literature reviewed, expert's opinion and scholar's own understanding of the problem following hypothesis are made:

H1: There may be any significant effect of transdisciplinary training protocol on perimenopausal problems of sedentary women

H2: There may be any significant effect of transdisciplinary training protocol on postmenopausal problems of sedentary women.

DEFINITION AND EXPLANATION OF TERMS

1. **Perimenopause:**
   it means around menopause and refers to the time during which your body makes the natural deposition to menopause, marking the end of reproductive years. It is also called menopausal transition. *(Physiology of sports and exercise by- Jack H. Willmore)*

2. **Postmenopause:**
   it is the time after you have been without a menstrual period for 12 months. During this stage menopausal symptoms, get milder or go away. People in postmenopause are at increased risk of osteoporosis and cardiovascular diseases. *(Physiology of sports and exercise by- Jack H. Willmore)*

3. **Cardiovascular risk:** Heart conditions that include diseased vessels, structural problems and blood clots. The variables such as hypertension/ high blood pressure and High-density lipoprotein and low-density lipoprotein comes under cardiovascular variable where lowdensity lipoprotein is bad cholesterol which leads to blood vessels clotting which may further lead stroke, and high-density lipoprotein being the good cholesterol helps in lowering the risk of heart diseases or stroke. Menopause leads to increase in low density lipoprotein and decreases the level of high-density lipoprotein. *(Physiology of sports and exercise by- Jack H. Willmore)*

4. **Hypertension/ high blood pressure:**
   It is usually defined as blood pressure above 140/90. The force of blood against the artery wall is too high. *(Human Anatomy & Physiology by- Elaine N. Marieb)*

5. **High density lipoprotein (HDL):**

HDL or good cholesterol, absorbs cholesterol and carries back to liver. The liver then flushes it from the body. High levels of HDL cholesterol can lower your risk for heart diseases and stroke. *(Human Anatomy & Physiology by- Elaine N. Marieb)*

6. **Low density lipoprotein (LDL):**
   Is often called bad cholesterol because it collects in the walls of your blood vessels, raising your chances of health problems like heart attack and stroke. (Human Anatomy & Physiology by- Elaine N. Marieb)

7. **Body weight:**
   The mass or quantity of heaviness of an individual. *(https://en.m.wikipedia.org)*

8. **Insomnia**:
   Is known as sleeplessness, is a disorder in which people have trouble in sleeping. It is due to fluctuations of thyroid, cortisol, progesterone, melatonin and growth hormone imbalance *(Foundation of sports and Exercise psychology by- Robert S. Weinberg)*

9. **Depression:**
   A mental health disorder characterized by persistently depressed mood or loss of interest in activities, causing significant impairment in daily life. *(Foundation of sports and Exercise psychology by- Robert S. Weinberg)*

10. **Arthritis:**
    This is disturbance of metabolism of estrogen. Aches and pains in the joints lead to arthritis which are common menopausal symptoms. Increased arthritis often happens at this time. *(Human Anatomy & Physiology by- Elaine N. Marieb)*

11. **Osteoporosis:**
    A condition where bones become weak and brittle. In osteoporosis, new bone creation doesn't keep up with old bone removal. Lowered estrogen level in menopause leads to osteoporosis *(Human Anatomy & Physiology by- Elaine N. Marieb)*

12. **Transdisciplinary:**
    Transdisciplinary means the exploration of a relevant concept, issue or problem be it mental or physical that integrates the perspectives of multiple disciplines in order to connect new knowledge, deeper understanding and solution of problem. In relation to sports training, it is also known as mixed training, where different training regimes with various exercises are performed enhancing different body systems and developing individual. On the basis of reviews:

    Michael Grunberg The most common form of transdisciplinary training is the multi-mentor training from his or her own discipline. The transdisciplinary trainee is faced with many

challenges, including learning the language and cultures of different discipline along with learning how to navigate within and between disciplines.
It enables students to create connections between various school subjects while exploring a relevant concepts, issue or problems.
Institute of Montana Zugerberg was able to implement transdisciplinary training in there institute.

A new transdisciplinary research model to investigate and improve the health of the public Helen Pineo

Transdisciplinary research approaches are being applied to today's complex health problems, including the climate crisis and widening inequalities. Diverse forms of disciplinary and experiential knowledge are required to understand these challenges and develop workable solutions. We aimed to create an updated model reflective of the strengths and challenges of current transdisciplinary health research that can be a guide for future studies.

Transdisciplinary model for quality control of bachelor's training in "Physical culture" Vladislav Zhabakov et. al

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The article considers the component content of the transdisciplinary model for quality control of bachelor's training in "Physical culture" at the strategic (potential) level, tactical (optimal) level, and operational (subject-operational) levels. Interiorized subjectivity, the awareness of the physical culture process and sports selfimprovement, and exteriorized subjectivity are identified as criteria for evaluating the quality of bachelor's training in the "Physical culture". We used the questionnaire "autonomy-dependence" by G. S. Parygin, "Methodology for diagnosing the level of reflection development" by A.V. Karpov to study the feature of transdisciplinary model for quality control of bachelor's training in "Physical culture". We used a modified questionnaire by V. I. Baidenko to study soft skills forming process. The software "SPSS v 17.0", descriptive statistics, φ* Fischer criterion was used for statistics. As a result of the formative in result of experiment, significant differences in reflexivity are observed. Thus, at the operational level, there is a predominance of retrospective reflection. Differences in the reflection level is identified at the tactical level. Comparison of KG and EG after conducting a formative experiment using the "autonomy" criterion allows us to conclude that there are statistically significant differences ($p \leq 0.01$). Significant differences in the concepts of competencies in KG and EG with an error ($p \leq 0.01$) were identified by the criterion of "maintaining" competencies. Thus, the introduction of a transdisciplinary model for quality control of bachelor's training in the "Physical culture" allows us to introduce innovative changes in bachelor's training based on the methodology of transdisciplinary.

A Department of Methodology Can Coordinate Transdisciplinary Sport Science Support Martyn Rothwell et.al

In the current sporting landscape, it is not uncommon for professional sport teams and of enhancing athlete performance. Despite the best intentions of multidisciplinary sport organizations to employ multidisciplinary sport science support teams. In these teams and organizations, a "head of performance" may manage a number of sub-discipline specialists with the aim science support teams, difficulties associated with integrating subdisciplines to

enhance performance preparation have become apparent. It has been suggested that the problem of integration is embedded in the traditional reductionist method of applied sport science, leading to the eagerness of individual specialists to quantify progress in isolated components. This can lead to “silo” working and decontextualized learning environments that can hinder athlete preparation. To address this challenge, we suggest that ecological dynamics is one theoretical framework that can inform common principles and language to guide the integration of sport science sub-disciplines in a Department of Methodology. The aim of a Department of Methodology would be for group members to work within a unified conceptual framework to coordinate activity through shared principles and language, (2) communicate coherent ideas, and collaboratively design practice landscapes rich in information (i.e., visual, acoustic, proprioceptive and haptic) and guide emergence of multi-dimensional behaviors in athlete performance.

This report was written by Sarah Schweizer, Vivi Stavros, John Breda and Carolina Adler, 3June 2016. In 2014, the International Social Science Council (ISSC), start, and National Research Foundation of South Africa (NRF) brought together and supported transdisciplinary researchers and practitioners for an expert workshop to design an initiative to support and sustain capacity development in transdisciplinary (TD) research at national and international levels. The workshop was organized in response to calls from Belmont Forum to strengthen capacity in the development, use, and evaluation of TD approaches. This increased emphasis on TD approaches in global change research for sustainability is indicative of the high degree of complexity of the problems that researchers on global change and sustainability have to address. It also reflects an ambition to ensure the relevance of the research produced, to drive science that can contribute effective and Equitable solutions to those problems. It signals an aspiration to break the walls between research and society, captured in the idea of doing science with society, instead for society.

SIGNIFICANCE OF STUDY

- The result of the study will provide knowledge regarding which stage of menopause is likely to be affected by training program.
- The result of the study will provide guidelines for future training programs of menopause.
- The result will help sedentary people to understand the value of training in menopausal conditions.
- The study will add new knowledge to the field of research of physical education in general.
- This study will help to know the severity of menopause and its treatment.

CHAPTER- II

REVIEW OF RELATED LITERATURE

Juhee cho et al (2014) Physical activity may be an effective way of preventing or attenuating menopause-related symptoms, and it has been shown to improve quality of life in menopausal women. However, there have been some inconsistencies regarding between exercise and menopausal symptoms, and study investigating this association has been scarce in Korea. In this study, the association between physical activity and menopausal symptoms in perimenopausal women in Korea was assessed. This cross-sectional observational study was conducted between November 2012 and March 2013. In total, 2,204 healthy women aged 44–56 years were recruited from a healthcare centre at the Kangbuk Samsung hospitals for investigating women's attitudes towards menopause. To investigate the influence of physical activity on perimenopause-associated symptoms, 631 perimenopausal women were selected for this study. Their physical activity levels were assessed using the International Physical Activity Questionnaire (IPAQ) short form. The Menopause-specific Quality of Life (MENQOL) questionnaire was used to assess menopause-related symptoms. The study participants were, on average, 48.5 ± 2.7 years old and had a mean body mass index of 22.8 ± 3.1 kg/m^2. The total MENQOL score and the psychosocial and physical sub scores exhibited Ushaped trends in relation to the level of physical activity. Multiple linear regression analysis adjusted for confounding variables showed that perimenopausal women who performed moderate physical activity reported significantly lower psychosocial (β = -0.413, P = 0.012) and physical symptoms (β = -
0.445, P = 0.002) than women who performed low physical activity. By contrast, a high level of physical activity did not influence the MENQOL total score and sub scores relative to the low activity group. In addition, no associations were observed between physical activity and the vasomotor and sexual symptoms in any group. Moderate level of physical activity was associated with reduced psychosocial and physical menopause symptoms in perimenopausal Korean women. Although these findings must be confirmed by prospective longitudinal studies, they suggest that physical activity may improve the symptoms of menopause, thereby increasing quality of life.

Faruk Abike (2010) The women aged 45–60 years and experiencing menopause naturally were included in the study. They were randomly divided into aerobic (n=18) and resistance (n=18) exercise groups. The women exercised 3 days per week for 8 weeks under the supervision of a physiotherapist. Aerobic exercise training was performed through a bicycle ergometer. Before and after the training, lipid profiles were measured and menopausal symptoms, psychological health, depression, and the quality of life were assessed through questionnaires. In both exercise groups, no significant changes in lipid profiles were observed. In the resistance exercise group, excluding the urogenital complaints, there were significant improvements in all subscales of Menopausal Rating Scale (MRS). In the resistance exercise group, excluding the phobic anxiety, there were significant improvements in all subscales of The Symptom Checklist. Depression levels significantly decreased in both groups. Improvements were observed in all subscales of menopause-specific quality of life questionnaire in both groups except for sexual symptoms. Resistance exercise and aerobic exercise were found to have a positive impact on menopausal symptoms, psychological health, depression, and quality of life

Aya EL Hajj (2020) This cross-sectional study was conducted among 1113 women, recruited from different Lebanese regions. The Menopause-Specific Quality of Life Questionnaire (MENQOL) was

used to assess menopause related symptoms. Menopausal status was classified according to the World Health Organization's definition of menopause. The International Physical Activity Questionnaire was used to evaluate the physical activity level of participants. Anthropometric measurements were taken by the research team Participants were 49.53 ± 5.74 years old and had a mean body mass index of 26.69 ± 5.37 Kg/m^2. The highest mean scores of MENQOL were found in the physical and psychosocial domains ($p<0.001$). Peri-menopausal women had the highest mean scores in the vasomotor, physical and psychosocial domains ($p<0.001$), while postmenopausal and menopausal women in the sexual domain ($p<0.001$). Almost half the participants (45.4%) had low physical activity level, which was significantly and inversely correlated with vasomotor, psychosocial, physical and sexual MENQOL subdomains ($p<0.001$). Menopausal status, educational level, crowding and body mass indexes, marital status, smoking and alcohol intake were among the factors that were significantly associated with the frequency and the severity of menopause related symptoms. Physical activity may play a protective role in attenuating climacteric symptoms and hence improve the quality of life of women during mid-life.

Dmitriy Bondarev et al (2020) Based on follicle-stimulating hormone levels and bleeding diaries, women (47–55 years) were classified as early (n = 89) and late perimenopausal (n = 143) and followed prospectively until postmenopausal status, with mean duration of 17.5 and 13.8 months, respectively. Physical performance was measured by handgrip force, knee extension torque, vertical jumping height, maximal walking speed, and 6-minute walking distance. Physical activity was self-reported and categorized as inactive, low, medium, and high. Longitudinal associations of menopausal status, physical performance, and related changes with PA level were analyzed using generalized estimation equations adjusted for duration of hormonal therapy.
A significant decline over the menopausal transition in handgrip force (−2.1%, 95% CI −3.8 to −0.4), knee extension torque (−2.6%, 95% CI −4.5 to −0.8), and vertical jumping height (−2.6%, 95% CI −4.2 to −1.1) and a significant increase in 6-minute walking distance (2.1%, 95% CI 1.4 to 2.7) were observed in the total sample. A significant interaction of PA by time was observed in handgrip force and in vertical jumping height. High PA women had greater increase in handgrip strength but greater decline in vertical jumping height than medium, low, and inactive women (all $p \leq .001$).Both early and late perimenopausal women show decline in muscle strength and power during the transition to post menopause. Physical activity seems to influence physical performance during the menopausal transition but understanding the benefits of PA requires interventional studies.

E berin et al (2021) Most women experience vasomotor symptoms (VMS) around menopause that may affect quality of life negatively. Effective pharmacological treatment exists but is not recommended for all women, and there is a demand for alternatives to reduce symptoms and improve quality of life. The objective of this study was to investigate the effect of a resistance training intervention on health-related quality of life (HRQoL) in postmenopausal women with This open randomized controlled trial included 65 postmenopausal women >45 years old with daily VMS. The participants were randomized to 15 weeks of resistance training three times per week or an untreated control group. The Women's Health Questionnaire (WHQ) and Short Form Health Survey (SF-36) were used to assess HRQoL at baseline and after 15 weeks. The resistance training group improved compared to the control group in the WHQ domains of VMS (p = 0.002), sleep problems (p = 0.003) and menstrual symptoms (p = 0.01) from baseline to post intervention. No significant between-group differences were found in SF-36 summary scores, or in any of the domains. In postmenopausal women with moderate to severe VMS, resistance training three times per week for 15 weeks improved menopause-specific HRQoL.

Azerbaijan Province (2014) The aim of the authors in this randomized controlled study was to assess the effect of exercise and nutrition education on quality of life and early menopausal symptoms. This trial was conducted in east, Iran, during the period from 2013 to 2014 with 108 women allocated into one of four groups (n = 27 in each group) by block randomization. The interventions received by the three intervention groups were: nutrition education, aerobic exercise, or exercise plus nutrition education. The control group did not receive any intervention. The Greene and MENQOL menopause symptom scales were completed before and at 8 and 12 weeks after the intervention. The mean Greene score was significantly lower than the control group in the exercise (adjusted mean difference: -5.1) and exercise plus nutrition groups (-8.0) at the end of week 8 and in the nutrition (-4.8), exercise (8.7), and exercise plus nutrition (-13.2) groups at the end of week 12. Also, the mean MENQOL score was significantly lower than the control group in the exercise (-8.3) and exercise plus nutrition groups (13.8) at the end of week 8 and in the nutrition (-6.6), exercise (-13.5), and exercise plus nutrition (22.1) groups at the end of week 12. Nutrition education with aerobic exercise can improve quality of life.

Yi- Yuan lin et al (2018) Exercise training is often considered the cornerstone of nonpharmacological therapy for postmenopausal hypertension while aerobic exercise is the mainstay of life style modification for antihypertension. Moderate-intensity aerobic exercise is well tolerated on most days of the week by most people with postmenopausal hypertension and is not suspected to detract from exercise adherence. That being said, moderate aerobic exercise may be superior for eliciting cardiovascular benefits in hypertensive postmenopausal women and resistance exercise may offer desirable benefits. The beneficial outcomes of exercise training for hypertensive postmenopausal women include improvements in blood pressure, autonomic tone, baroreflex sensitivity, oxidative stress, nitric oxide (NO), bioavailability, and lipid profiles, as well as cardiovascular function and cardiorespiratory fitness. This partly explains the fact that exercise training programs have a positive effect for cardiovascular disease in hypertensive postmenopausal women. This review is to collect and present the literature of exercise training in postmenopausal hypertension. Our review may provide the current understanding of beneficial effects and mechanisms of exercise intervention for prevention and treatment of stage 1 to 2 hypertensive postmenopausal women.

Menopause is associated with negative cardiovascular adaptations related to oestrogen depletion, which could be counteracted by physical exercise (PhE). However, the impact of total adherence-rate (TA) to PhE and sedentary time (SedT) on cardiometabolic profile in this population has not been elucidated. For 13-weeks, 43 women (57.1 ± 4.7 years) participated in a 4-days-a-week moderateintensity walking training. They underwent laboratory, anthropometric and echocardiographic assessment, before and after training (T0-T1). Spontaneous physical activity (PhA) was assessed with a portable multisensory device. The sample was divided according to TA to PhE program: <70% (*n* = 17) and ≥70% (*n* = 26). TA ≥ 70% group experienced a significant T1 improvement of relative wall thickness (RWT), diastolic function, VO2max, cortisol, cortisol/dehydroandrostenedione-sulphate ratio and serum glucose. After adjusting for SedT and 10-min bouts of spontaneous moderate-tovigorous PhA, TA ≥ 70% showed the most significant absolute change of RWT and diastolic function, body mass index, weight and cortisol. TA ≥ 70% was major predictor of RWT and cortisol improvement. In a group of untrained, postmenopausal women, a high TA to a 13-weeks aerobic PhE program confers a better improvement in cardiometabolic profile, regardless of SedT and PhA levels.

Filiz kilic (2020) osteoarthritis (OA) is a common musculoskeletal problem encountered in the postmenopausal period. This study aimed to determine the impact of aerobic exercise on functional limitation, exercise tolerance, and performance tests in postmenopausal women with knee OA. A total

of 50 women (aged between 48-78) with grade 2-3 knee OA according to the Kellgren-Lawrence radiographic scale were enrolled. OA-specific physical performance tests (40 m Fast-Paced Walk Test (40mFPWT), 30 s Chair Stand Test (30sCST), Stair Climb Test (9-step SCT)), six-minute walk test (6MWT), Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), and Visual Analogue Scale (VAS) were performed. Fifty patients were randomized to either the treatment or control groups. The treatment group received an additional aerobic exercise training along with a combined physiotherapy program for six weeks. The aerobic exercise program was carried out by the same physiotherapist every weekday (five days) for six weeks. The control group only received a combined physiotherapy program for six weeks. The post-treatment comparisons of the two groups yielded similar SCT results ($p > 0.05$), while VAS scores, the results of all performance tests, WOMAC scores, and the distance covered in 6MWT were significantly higher in the treatment group ($p < 0.05$). Consequently, this study provides an insight into the efficacy of the aerobic exercise program applied along with a combined physiotherapy program in postmenopausal women with knee OA.

Rosario Alonso et al During the transition to menopause, women experience different psychological, hormonal, and physical alterations that can affect their health. Physical activity is considered an important strategy in the prevention and control of such changes. To evaluate the short-term effect of an intensive intervention, based on a combined exercise programme using a Smart band, on the increase of physical activity and the decrease of sedentary lifestyle in postmenopausal and inactive women. Randomized clinical trial with two parallel groups. In total, 100 postmenopausal and inactive women aged 45-70 years will be randomized to a control group or an intervention group. Both groups will be given a standardized advice about physical activity. The intervention group will carry out a supervised 12-week programme of aerobic and muscle strengthening exercise; moreover, the women in this group will receive a Smart band to assist them in the intervention. The main result will be the increase of physical activity and the decrease of sedentary lifestyle, measured with an accelerometer for 1 week. This programme will be conducted by a nurse and a physiotherapist of the health centre. The study was approved by the Drug Research Ethics Committee of the Salamanca Health Service on 15 February 2019. The project was funded by the Autonomous Government of Castile and Leon and by the Carlos III Health Institute. Physical activity is an important strategy to consider when addressing the changes caused by menopause, although the current evidence shows that further studies should be carried out with longer intervention periods and new technologies. This study will allow determining the effectiveness of the intensive intervention based on a combined programme of physical activity using a Smart band in postmenopausal and inactive women.

Carmen villavarde et al (2006) Forty-eight menopausal women aged 55–72 years were recruited at a primary care centre as voluntary participants in a quasi-experimental study. They were randomly assigned to one of two groups: control ($n = 24$) and experimental ($n = 24$). The experimental group participated in a 12-month programme of cardiorespiratory, stretching, muscle-strengthening and relaxation exercises carried out during two fully supervised exercise sessions per week (total of 3 hours weekly). Health-related quality of life was assessed by using the Quality-of-Life Profile for Chronically Ill Patients, a generic questionnaire widely used in epidemiological and clinical studies to measure wellbeing and function, incorporating as an optional module the Kupperman Index of Menopausal Symptomatology. There was a statistically significant improvement in the health-related quality of life of the experimental group, whereas the health-related quality of life of the control group significantly worsened. Menopausal symptoms also significantly improved in the experimental group and significantly worsened in the control group over the 12-month study period. A customized exercise program is valuable for improving the health-related quality of life of menopausal women.

CHAPTER – III

METHODOLOGY

In the present chapter procedure and methodology is given under headings, selection of subjects, selection of variables, administration of test, description of administrations of test, criterion measures, data collection, tester reliability, tester competency and reliability of test, instrument reliability, administration of training program, experimental design of the study, procedure of data collection, statistical technique. The details of various headings are given below.

SELECTION OF SUBJECTS

The population of the study will be sedentary menopausal women under (perimenopausal and postmenopausal stage of menopause) of Varanasi (U.P.) region. Purposive sampling technique will be used for the selection of subjects. 40 sedentary menopausal females will be purposively selected, among which 20 perimenopausal and 20 postmenopausal sedentary women, ranging in an age group of 40 to 57 years will be selected and grouped accordingly.

SELECTION OF VARIABLES:

On the basis of available literature reviews, gap of knowledge, and feasibility criteria, the researcher selected the following variables for present study:

(i) Cardiovascular variable

a) Hypertension/ high blood pressure
b) High density lipoprotein
c) Low density lipoprotein

(ii) Osteoporosis

(iii) Arthritis

(iv) Insomnia

(v) Depression

(vi) Body weight

ADMINISTRATION OF TESTS:

Maximum care and attention to be given for accuracy in collection of data. Sophisticated instruments and standard procedures will be used to assess the performance on different variables.

Cardiovascular variables

Hypertension/ high blood pressure:

Sphygmomanometer and stethoscope and standard procedure will be used for measuring blood pressure and scores will be recorded in millimetre of Hg (mm of hg).

High density lipoprotein/ low density lipoprotein:

Lipid profile will be done to test the amount of cholesterol in your blood.

Osteoporosis

Serum blood test to be done for osteoporosis, vitamin d, calcium test through blood profile.

Arthritis

X- ray to be done to diagnose arthritis.

Psychological variables:

Questionnaire to be used to assess the problem of insomnia and depression.

Body weight

Body weight will be assessed using weighing machine.

COLLECTION OF DATA

The data will be collected twice for both the groups of perimenopausal and postmenopausal that before the training program and 6 weeks after the training program.

The data for cardiovascular variables (hypertension/ high blood pressure, HDL, LDL), psychological variables (insomnia, depression), weight gain, osteoporosis, arthritis, vasomotor symptoms will be collected twice as well that is before the start of training program and after 6 week of training programs. 20 women for perimenopausal and 20 women for post-menopausal stages will be assessed for 6 weeks.

EXPERIMENTAL DESIGN

Pre-test and post-test purposive group design will be employed in the study. Two groups will be there, group A as perimenopause and group B as post menopause with 20 subjects each in both the groups, the groups comprising of different age menopausal women. Perimenopausal group having 40 to 50 age group and post-menopausal having age group 50-57 Both the groups will be provided aerobic, strength/ resistance training, meditation, Zumba sessions and anaerobic training. The training program will last for 6 weeks after which a post test will be conducted for both groups.

TREATMENT PROCEDURE

For the purpose of this study, the training approach consist of two groups perimenopausal group and postmenopausal group.

Perimenopausal group& Postmenopausal group: since it will be a comparative study based on same parameter of menopause being compared on the basis of it two stages of perimenopause and post menopause. Both the groups will be getting the same training session. 3 days a week will be the training provided, i.e., Monday, Wednesday and Friday in the evening session. The load will be gradually increased throughout the six weeks. Subject will start with warm-up with exercises. After the warm-up they will perform the exercises accordingly. They will perform aerobic exercises (fast walking, jogging, 6 min run/ walk, Zumba) resistance training or strength training, stretching exercises, meditation. They will be instructed to do so by increasing the intensity gradually. After every set they will be provided rest of 5 mins. At the end of every training session, they will be made to do proper limbering down with stretching exercises so that they be ready for next training session and they will also be provided with energy drink for better recovery.

TRANSDISCIPLINARY TRAINING PROTOCOL

DAYS	**1ST WEEK**	**INTENSITY**	**SETS&REPETITIONS**
MONDAY WEDNESDAY FRIDAY	Walking Spot running Resistance training Stretching exercises	40% intensity 40-50% intensity 40% intensity 45% intensity	7 rounds 3*2(3 repetitions*2 sets) 2*3(2 repetition's*3sets) 3*3(3 repetition's*3 sets)
MONDAY WEDNESDAY FRIDAY	**2ND WEEK** Jogging Fast walking Brisk walking Obstacle run Resistance training (Pelvic floor exercise, Planks, walking lunges)	 40% intensity 50-60% intensity 60% intensity 50-60% intensity 60% intensity	 5 rounds 6 rounds 7 rounds 1 circuit 2*3(2sets*3repetiton's)
MONDAY WEDNESDAY FRIDAY	**3rd week** Zumba Exercise with resistance band	 60% intensity 55-60% intensity	 25 minutes 3*2(3sets*2repetiton's)

	Knee extension, elbow extension exercises Dumbbell strength exercises	50-60% intensity 60% intensity	3*3(3sets*3repetition's) 3*2(3repetition's*2sets)

MONDAY WEDNESDAY FRIDAY	**4TH WEEK** Fast jogging Shuttle run Step-ups Strength exercises (With Swiss ball, medicine ball) (Squats to chair, lying hip bridge, wall push ups, etc) Balancing exercises Stretching exercises	 65% intensity 60% intensity 65% intensity 50-60% intensity 60% intensity 50% intensity	 8 rounds 3*3(3repetiton's*3sets) 4*3(4sets*3repetiton's) 3*3(3sets*3repetition's) 4*3(4sets*3repetition's) 3*3(3sets*3repetitions)

MONDAY WEDNESDAY FRIDAY	**5TH WEEK** Sand running High knee, short high knee, scissor exercise with weights. Calisthenics (own body weight exercise) Strengthening exercises Stretching and balancing exercises	55% intensity 50-60% intensity 50-55% intensity 50-60% intensity	3*3(3sets*3repetition's) 4*3(4sets*3repetiton's) 3*3(3sets*3repetition's) 3*3(3sets*3repetition's)
		50-55% intensity	3*2(3sets*2repetition's)
MONDAY WEDNESDAY FRIDAY	**6TH WEEK** Zumba Shuttle run Circuit training Strength/ resistance exercises (squats, wall push ups, boat pose, lunges, floor exercises) Skipping	65% intensity 60-65% intensity 65% intensity 60 % intensity 50% intensity	30 minutes 3*3(3sets*3repetition's) 2 complete circuit 3*2(3sets*2repetition's) 3*3(3sets*3repetition's)

STATISTICAL TECHNIQUE

To find out the significant difference of mean of pretest and posttest of both the groups ANCOVA (analysis of covariance) will be used to compare the performance of the groups, and to know which group is better. The level of significance will be set at 0.05.

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